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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,749	02/18/2004	Yoshihiro Kimura	H6808.0040/P040	2045

24998 7590 06/03/2011

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EXAMINER	
JOHNSTON, PHILLIP A	

ART UNIT	PAPER NUMBER
2881	

MAIL DATE	DELIVERY MODE
06/03/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/779,749	KIMURA ET AL.	
	Examiner	Art Unit	
	PHILLIP A. JOHNSTON	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-16,19 and 20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-16,19 and 20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

1. This Office Action is submitted in response to the RCE filed 4-28-2011, wherein claims 17 and 18 are cancelled; claims 19 and 20 are added; and claims 12-16 have been amended. Claims 12-16, 19 and 20 are pending.

Response to Arguments

2. The applicant's arguments filed 8-17-2010 are based upon amendments to the claims that are not supported by the specification and are therefore moot.

Claims Rejection – 35 U.S.C. 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 12 and 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contain subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Particular subject matter contained in claims 12 and 14 includes the limitation, "judging the longer of the first and second distances to correspond to a line pattem, or the shorter of the first and second distances to correspond to a space between the line patterns, based on a comparison between the first distance and the second distance;

adjusting, based on a judgment result of line pattern or space between adjacent line patterns from the judging step."

The examiner has construed the newly amended limitation above using paragraph's [0034] through [0040] in applicants published specification, and concluded that the newly amended claim limitation is improper because the specification does not describe judging, by comparing the distances 405S and 405L of the derivative of peak 401 (note Figure 4), as corresponding to a line pattern or a space between line patterns, but rather the distances 405S and 405L correspond to the space side and the line side respectively of the peak vertex of the profile 401.

The examiner also concludes that the claimed first and second distances of the derivative waveform cannot be used to determine a line pattern or a space between line patterns, because the first and second distances of the derivative waveform are calculated for a single peak of a profile waveform, and one of ordinary skill in the art recognizes that a profile waveform of a line pattern contains two peaks defining each line, which applicant correctly describes in Figure 3C. However, the specification contains no description of derivative waveforms being calculated for both peaks of a scanned profile waveform, as the prior art references teach. Nor is the applicant's single peak derivative method a trivial extension to an entire line/space pattern that would be obvious to one of ordinary skill in the art, particularly since the space profile derivative has not been described in the disclosure, nor is a description regarding the boundaries between the peak profile and space profile derivatives.

Therefore, a claim of a method of determining a pattern or a space between adjacent line patterns that is described in the specification as based upon a single derivative of a single

profile peak, does not constitute a specification that contains a written description of the invention, and the manner and process of making and using it, in full, clear, concise, and exact terms that would enable any person skilled in the art to make and use the invention

For purposes of this examination, the examiner assumes the newly amended claim 12 and 14 limitation above", will read as follows;

"12. (Currently amended) A method of determining a line pattern or patterns arranged as a plurality of line patterns on a sample, the method comprising the steps of:

scanning a portion including an edge of a line pattern on the sample with a charged particle beam;

forming a derivative waveform based on a profile waveform formed by detecting charged particles emitted from the scanned portion of the sample;

acquiring a first distance between a top and a foot portion of a first peak of the derivative waveform, and a second distance between a top and a foot portion of a second peak of the derivative waveform;

judging the longer of the first and second distances to correspond to a line portion, based on a comparison between the first distance and the second distance;

adjusting, based on a judgment result of line portion from the judging step, a position of an image in such a manner that a position of a portion of the image to be measured is brought to a position that has been set for measuring a pattern size;

and

measuring the portion of the image to be measured that has been position adjusted."

Claim 14 is assumed to be modified similarly, by removing the reference to the "space between adjacent line patterns".

Claims Rejection – 35 U.S.C. 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 12-16, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,627,887 to Dudley, in view of Archie, USPN 6,472,662.

7. Regarding claims 12 and 14, Dudley discloses at Col. 2, line 48-66, a method of determining a line pattern that includes the following steps;

(a) scanning a particle beam over line structure 126 as shown in Figure 2 below, where a dimensional or profile waveform is generated by detecting the quantity of particles deflected back from the line structure, which is saved in memory. Col. 2, line 63-67 and Col. 3, line 1-7,

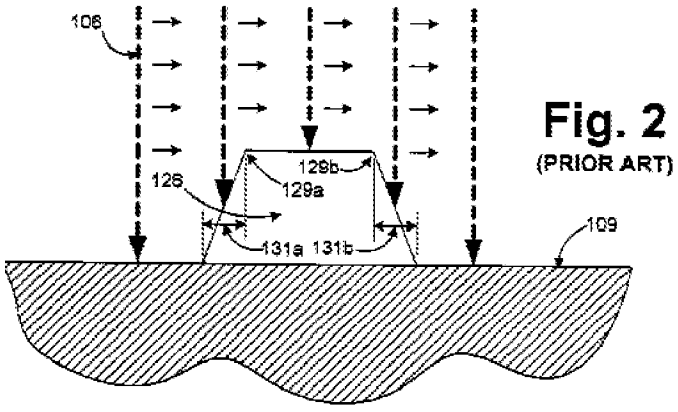


Fig. 2
(PRIOR ART)

(b) forming the derivative waveform from the stored dimensional waveform, as shown in Figure 3A below of. Col. 3, line 8-15; and Col. 5, line 5-20,

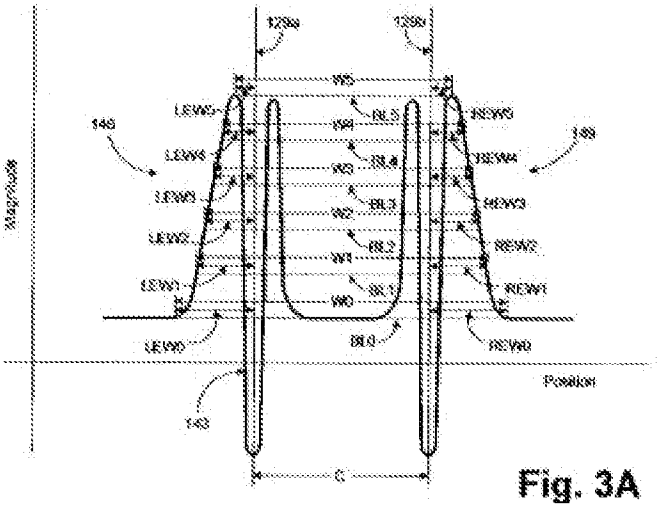
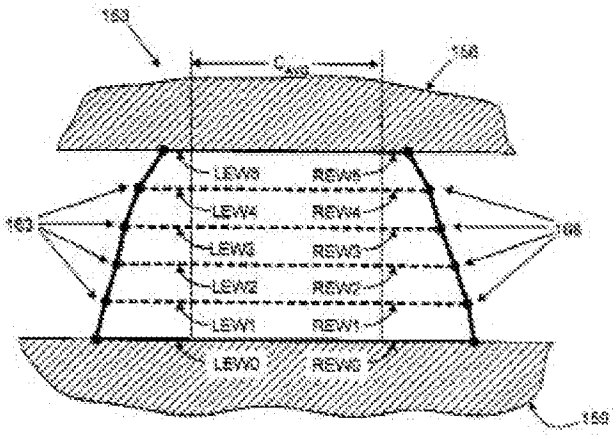


Fig. 3A

(c) comparing first longer distance LEW2 (Figure 3A above) of the positive derivative peak and second shorter distance LEW 5 of the negative derivative peak 143, which defines the boundary 129a (note Figure 2) between the space-side and the line side of the peak, as well as the entire transition 131a from the left foot to the top edge of the left profile peak. Col. 3, line 16-50,

(d) determining the shape of the whole structure 126 as shown in Figure 3B, from the pairs of longer and shorter distances LEW1-5 and REW 1-5 between the two peaks in the derivative waveform (note Figure 3A above). Col. 3, line 63-67 and Col. 4, line 1-30.



Dudley discloses scanning the entire patterned structure of an integrated circuit at Col. 1, line 57-67 and Col. 2, line 1-10.

Dudley fails to disclose determining a line pattern.

Archie discloses obtaining waveforms of SEM scans over line and space patterns at col. 1, line 44-55 and col. 3, line 4-8

Archie modifies Dudley to provide waveforms of scanned line and space patterns, where the geometry of the pattern includes equal line and space widths. Col. 8, line 55-67 and Col. 9, line 1-5.

Therefore it would have been obvious to one of ordinary skill at the time the invention was made that the scans of integrated circuit patterns of Dudley would include forming derivatives of each line in the line patterns of Archie, thereby determining the shape of an entire line pattern.

8. Regarding claims 13 and 16, the combination of Dudley and Archie discloses the use of patterns having equal lines and spaces, as described above regarding claims 12 and 14.

9. Regarding claim 15, Dudley discloses referencing the pairs of longer and shorter distances LEW1-5 and REW 1-5 in the derivative waveform to baseline levels at the base or

feet of each pair of peaks, where the 0% baseline level is equivalent to a zero line, base or flat line. Col. 3, line 16-25.

10. Regarding new claims 19 and 20, Dudley fails to teach determining a target location for measurement of a sample based on the judged positions of the line patterns; however Dudley discloses use of a target structure and comparing measured profiles with a target profile. Col. 5, line 46-53. Dudley further teaches that the edges of the target structure are defined by coordinates at Col. 7, line 62-65 and col. 10, line 22-30.

One of ordinary skill in the art would recognize from the references above that samples are measured relative to the coordinate system location of the standard target of Dudley.

Therefore it would have been obvious to one of ordinary skill at the time the invention was made that the combination of Dudley and Archie teaches the claimed measuring of the pattern in accordance with the method described above regarding claims 12 and 14.

Conclusion

11. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571)272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ

June 2, 2011

/Phillip A Johnston/

Primary Examiner, Art Unit 2881